BOOK REVIEW

Mathematical Methods in Solid State and Superfluid Theory

Scottish Universities Summer School (1967) Edited by R. C. Clark and G. H. Derrick. *Oliver & Boyd, Edinburg*, 1969. 77s. pp 400.

The summer school was meant primarily for "theoretical physicists of at least one year's post graduate standing. "However the reviewer feels that most of the reports are at such a level that only fairly experienced workers will be able to utilise them to advantage. A very wide field is covered—there are eight long lectures and seven short report of recent reasearches. The first one, by Lanczos, gives an outline of classical mechanics and then goes on to the discussion of Noether's theorem that an invariance of the Lagrangian with respect to an infinitesimal transformation is associated with a corresponding conservation principle and thus obtains the conservation laws both of mechanical systems and fields. The second lecture is a fairly long discussion of transformation theory by Gross. Baym then takes up the microscopic description of superfluidity and brings out the essential similarity between theories of liquid He and superconductivity. The next lecture by Luttinger on transport theory considers the transport coefficients as tensors and after obtaining Kubo type formulae goes on to a derivation of transport equation using diagram techniques. Valatin's article on 'Density matrix methods and superconductivity theory' discusses the subject matter starting from Hartree-Fock method and then goes on to the magnetic coupling effects in a superconducting film. There are two other main lectures—one on perturbation theory and its application by Brueckner and another on exactly soluble models (discussing Heisenberg chains and two dimensional Ising model) by Lieb. This simple cataloguing of the main lectures and the fact that there are besides seven research reports are perhaps enough to show that the volume will be of great use to a varied group of workers and any library should have a copy if there be an interest in advanced theories of solids and superfluids.

A. K. R. C